

represented in plate V. fig. 9, a section of it being figured in fig. 10. Of *Polyommatus* I have twelve species, or very distinct varieties; of *Thecla* twenty-five, some very distinct and beautiful. Of some genera of minute *Lepidoptera* I have beautiful series, especially of the *Pyralidæ*; and of the china-marks, and their allies, some very handsome species.

It may be worthy of notice that if a *Centipede* be mutilated by a blow which only half kills it, after its death it contracts in length to a very great degree, whence I was formerly led to believe this to be a specific peculiarity. I may also add, in correction of a previous remark of mine, that I now possess numbers of the cast skins of the Ceylonese species of *Phrynus*.

XIV. *Notes on Indian Lepidoptera.* By CAPTAIN THOMAS HUTTON. In a letter addressed to J. O. Westwood, Esq.

[Read 5th October, 1846.]

Mussooree, 26th June, 1846.

MY DEAR SIR,

Your letter was duly received, and I would long ere this have answered it had I not wished to do so after another careful examination of the manner in which the *Saturnia Selene* (*Plectropteron Diana*) effects its exit from the silken cocoon. After such examination however I can find nothing to alter or add to my former notice of the insect, except that I have made a rough sketch of the caterpillar (Plate V. fig. 11.) and enclose it in this letter; the colours are dull compared to those of the living insect, and the green is beautifully soft and almost transparent, while at the same time the animal feels crisp and firm to the touch; the sketch is very imperfect and faulty, but will convey the figure of the caterpillar accurately enough if not already known. You state in your letter that you cannot believe the escape from the cocoon is effected by the instrument I pointed out, (namely the appendages at the sides of the front of the thorax,) because that is present in all *Lepidoptera*; this however, so far from upsetting my statement, should rather lead to the suspicion that many other species may effect their escape in the same manner as *S. Selene*, particularly as in many cases it is not

positively known how such escape is made. Look to *Saturnia* for instance, or at least to some of the genus, which are described as having "no mouth and as taking no nourishment in the imago state;" how does such a moth effect its escape? It cannot be by ejecting a fluid from the mouth to dissolve the threads, because the mouth is wanting; it must therefore be done by some such instrument as that already pointed out, or by a fluid from the anus. In regard to the common *Tusseh* moth of India, which is said to possess no mouth, the escape from the cocoon, which is very hard indeed, is effected by a liquid and not by cutting; this I have frequently watched; the liquid must surely be from the anus, since the mouth is wanting; the new mulberry moth which you have kindly noticed (*Bombyx Huttoni*, Westw. Cab. Or. Ent. pl. 12, f. 4,) likewise effects its escape, as does *B. mori*, by moisture, but whether from mouth or anus is, I suspect, not precisely determined.

In the 112th number of the Annals of Natural History I see Captain Boys remarks that he had never observed any *Lucani* in the plains of India, although very common in the Himalayas: *Lucanus Girafa* of Olivier has nevertheless been captured at Saugor in central India by Mr. Benson, and I took it abundantly last year at the foot of the hills in the Deyrah Dhoon; that valley however, at the place where the insect was taken, has an elevation of about 3500 feet above the sea. I likewise last year obtained a very curious and interesting beetle at Mussooree, elevation about 6500 feet; it was cut out of the trunk of an oak tree which was being broken up for fire wood; it is allied to *Scarabæus longimanus*, and belongs, I suspect, to the genus *Eucheirus*. I shall send it home shortly, and beg of you to present it to the Entomological Society of London, with my best respects. Mr. Benson obtained the thorax of another specimen from a similar situation, and a lad at this place possesses a perfect male likewise, but will not part with it. 1845 was the first year in which any of us suspected the existence of such an insect up here, and yet we have in some instances collected for the last ten years. By the bye, I observed in a former number of the Annals and Mag. Nat. History, that you had read before the Entomological Society an extract of a letter from Colonel Hearsey, in which he states that he had seen *Papilio Pammon* and *P. Polytes* in coitu; this appears to induce, or rather to confirm, an opinion which had previously been entertained, namely, that the insects were identical, being the two sexes of the same species. This opinion I am convinced is wrong, and the insects totally distinct as species, and my reasons are these; viz. 1st, I possess specimens of males and females of

both species; 2nd, the fact of their being taken in coitu is no more conclusive evidence of identity of species, than the same act between the *ass* and the *mare* would be! or the linnet and canary, or of depraved man with the brute beast! The species being nearly allied, may in certain cases where the females of either are scarce, or have been destroyed by some mischance, lead the amorous male to couple with the nearly allied species, in order merely to gratify his fierce desires, but we have no proof of the female becoming prolific from such intercourse; nor if we had, could it furnish more evidence than in the case of the horse and ass. I shall endeavour by the end of the year to make up a box of insects for the Entomological Society, and another for yourself, which I must beg you to accept. I shall likewise endeavour to procure a supply of the new mulberry silk worm; the eggs which I had procured for you were kept in too warm a situation, and hatched at a season when there were no mulberry leaves, so that they all died. In the meantime, I send you a few remarks on the genus *Papilio*, which will show what we have here in that genus.

Order LEPIDOPTERA.

Section 1. LEPIDOPTERA DIURNA.

Family 1. PAPILIONIDÆ.

Genus 1. PAPILIO.

Sp. 1. *Papilio Machaon.* The Swallow-tail Butterfly.

It does not appear to differ from examples of the European insect which I possess. At Deyrah, in the valley of the Dhoon, it is seen on the wing as early as February, and in April, its caterpillars are abundant there on the carrot. At Mussooree, in the hills, it appears in the latter end of March and continues till October. The caterpillar is green, with a black velvety transverse band across each segment, bearing four spots of bright orange; it possesses the orange coloured retractile process in the head, from which exudes a liquid drop of a strong aromatic scent, when the insect is touched, precisely as in the European caterpillar. The food is the wild and garden carrot, and the leaves and flowers of the raddish. I have taken the caterpillars at Mussooree early in May, and the pupa on the 18th May. The same species is abundant at Simla, and extends far into the interior.

Sp. 2. *P. Podalirius.*

This species, if it really does exist in these parts, must be

extremely rare, for during a five years' residence at Mussooree, I have never been fortunate enough to see a specimen either on the wing, or in collections made here. In 1841, however, I captured a caterpillar, which I believed to belong to this insect, but to my great disappointment, it produced nothing. I therefore mention the existence of this butterfly at Mussooree, from having seen a very exact painting of the insect, done some years ago by a lady who captured a specimen near the village of Bhuttah, near Mussooree. The evidence of its occurrence may be considered insufficient, but this notice may induce collectors to make a close search for the species.

Sp. 3. *P. Epius*.

Occurs in the Deyrah Dhoon, and likewise in the hills during summer. Donovan gives the habitat "China," and Cramer, who figures it under the name of *P. Erithonius*, (Plate 232, A B,) says it is very common in China, Java, and on the coast of Coromandel, but never at the Cape of Good Hope. I have received it from Madras, and frequently took it at Neemuch, in Western India; the caterpillar feeds on the citron, and is green, with a reddish or orange coloured head; the fourth segment of the body is also bordered with the same colour, and there is a lateral oblique stripe on the hinder parts, which is blackish and edged with white; the spiracles are black; there are two short tentacular horns projecting from the anterior segment, and two others from the anal segment, beneath which latter is a whitish stripe, running obliquely forwards and downwards; a white lateral stripe above the legs, which are yellowish. It is very like the larva of *P. Pammon*, figured by Horsfield, except that the latter has no tentacular horns.

Sp. 4. *P. Demoleus*.

This likewise occurs in the Dhoon and in the hills; it very closely resembles the last, but is readily distinguished by the red spot at the inner margin of the lower wings, having a blue eye-shaped mark above it. It is figured by Donovan as a Chinese insect, and Boisduval gives the "coast of Guinea, Senegal, and Madagascar;" Fabricius again gives the East Indies, and says "the larva is solitary, smooth, of a yellowish green colour, with a reddish head, two tentacles on the neck, and a bifid tail. Boisduval again applies this to *P. Epius*, stating that *P. Demoleus* has been reared at Senegal by M. Dumolin, and that the larva feeds on the citron trees."—(Westwood's *Donovan's Insects of China*.) Boisduval seems to be right in referring this description of the

larva to *P. Epius*, but considering how nearly the two species are allied, it is not surprising that the larva should be very similar, and the description of the larva of the one species may therefore very nearly suit the other also. *P. Demolcus*, however, is not confined to Africa, as Boisduval's remarks would lead one to suppose, but is found in China according to Donovan, and in India according to Fabricius; the latter statement I can corroborate, for the species is far from uncommon here. It is figured by Donovan, and also by Cramer, (plate 231, A B,) who states that it is from the Cape of Good Hope.*

Sp. 5. *P. Protenor.*

Donovan figures the female, and Cramer gives both sexes (plate 49, A B) as found in China. It is by no means an uncommon species in the warm glens of these hills during the summer months, and it is common in the Dhoon. Its flight is somewhat heavy and unsteady.

Sp. 6. *P. Dissimilis.*

Occurs in warm glens as well as in the Dhoon, but it does not appear to be very numerous. It is figured by Cramer (plate 82, C D), and said to be from China, where it is supposed to be common, as almost every collection from that country is said to contain them.

Sp. 7. *P. Panope.*

Is found rather sparingly in the hills during summer, but is more abundant in the Dhoon. It is figured by Cramer (plate 295, E F) as coming from China.

Sp. 8. *P. Polytes.*

Cramer gives plate 265, C, as the female of *P. Polytes*, A B; in this he is wrong, as I have taken males and females of both. *P. Polytes*, A B, is not uncommon here during the rainy season, and at Rajpore, at the foot of the hills, it is frequently met with. Cramer's figure C is a distinct species, which is also found here, but its name is unknown to me. Cramer gives the habitat China, Java, and coast of Coromandel, to which may be added the Himalayan vallies, the Deyrah Dhoon, Neemuch, and Saugor.

Sp. 9. *P. Pammon.*

This is the most common species of the genus, being sometimes

* [Dr. Templeton states (ante, p. 44,) the distinction of the sexes of *P. Epius*, which Captain Hutton has evidently regarded as two species.—*J. O. W.*]

seen in dozens in the same field at Rajpore, and elsewhere in the Dhoon during the months of August and September; nor are they uncommon in the glens of these mountains. They are subject to great variety in the size of the white spots which compose the band on the posterior wings, as well as in the size and colour of the lunules on the under side. It is figured by Cramer (plate 141, B), and stated to occur in China, on the coast of Coromandel, and in Bengal. It is found also at Saugor, in Central India, and I have received it from Madras. Mr. Westwood mentions in his "Arcana Entomologica," that Colonel Hearsey had observed *P. Pammon* and *P. Polytes* chasing each other *con amore*, and that this fact partially confirms the statement of Boisduval as to their specific identity. Boisduval's supposition, however, is decidedly incorrect, for I have repeatedly taken the males and females of the two species; besides which, the fact of the one chasing the other could furnish no evidence, since I took at Neemuch a fine specimen of a male *Euplœa Plexippus* actually *in coitu* with *Euplœa Chrysippus*, and yet there can be no doubt whatever of the distinctness of these as species. It may so happen that in some seasons, the females, from particular causes, are scarce, and the males, burning with fierce desire, may not improbably give chase to and even couple with closely allied species, but this fact is no more conclusive evidence of identity of species, than the same act between the ass and the mare would be; or between the linnet and the canary. It merely shows that nearly allied species may, under certain circumstances, couple together for the purpose of satisfying their desires, but we have no proof of the female becoming prolific from such intercourse, nor even if we had, could it furnish more evidence than that we derive from the breeding of the horse with the ass.

Sp. 10. *P. Glycerion*, Gray.

This very delicate and beautiful species is figured in Westwood's "Arcana Entomologica;" it is rather rare with us, and I have never seen it on the wing. Mr. Westwood's figure is taken from a specimen captured at or near Simla.

Sp. 11. *P. Agestor*.

Is described by Mr. G. R. Gray as from Sumatra, but Westwood's figure is from a specimen taken in India. It is one of the earliest of the genus, being found in woody situations in April and May, dancing lightly over the tops of low bushes and trees, with a sailing kind of flight, gliding along without moving the wings. It is by no means rare at Mussooree.

Sp. 12. *P. Sarpedon.*

Is one of the commonest, but not the least beautiful of our butterflies; it appears early in May, and is found till the end of the rains in September. It usually frequents the top of oak trees, where it flits about with a jumping or jerking flight, and is somewhat difficult to capture from its quickness, and the height at which it keeps. It is figured by Cramer (plate 122, D E), and stated to be from China and Amboyna.

Sp. 13. *P. Cloanthus*, Westwood.

Is very common in fine warm weather, flitting with great rapidity over the tops of the forest trees. It usually selects some lofty oak, over the summit of which it continues to dance with a jerking flight like that of *P. Sarpedon*, until its domain is invaded by another individual, when a rapid chase round and round the tree takes place; one while they dart away from the tree down the side of the steep mountain, but ever and anon return to the favourite tree, until one is fairly driven off, when the other resumes its dance as before. It is difficult to capture, from its high and rapid flight. It appears in the end of April, and continues throughout the summer. It is most nearly allied to the foregoing, but has tails to the posterior wings. It is figured in Westwood's beautiful work the "Arcana Entomologica."

These are all the species of this genus with which I am as yet acquainted as inhabitants of these hills, but should such like communications be acceptable, I shall be very happy occasionally to record any facts that may come to my knowledge.

P.S. Since writing the above, it has occurred to me that I am wrong in saying we have no other species of *Papilio*, as there is certainly one, and probably two others. One seems to be very closely allied to, if not identical with, *P. Arcturus*, but there are some points of difference which make me hesitate to pronounce them identical; this one is very common in the Dhoon, and in warm glens in the hills, during the latter part of the summer or rainy season; the other species or variety differs in having no tail to the blue patch on the posterior wings,—the patch being a mere large spot, and the under surface has red lunules also. In *P. Arcturus*, a yellow crescent spot is represented by Westwood at the eye spot of the posterior wings, which neither of my species possesses.